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DURING THE NESTING SEASON**

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MOVEMENTS AND BEHAVIOR OF HEN PHEASANTS DURING THE NESTING SEASON¹

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Abstract: Five hen pheasants (*Phasianus colchicus*) on a state-owned public shooting area in east-central South Dakota were fitted with 151 mHz radio transmitters during spring and summer periods of 1965 and 1966. Two of them, radio-equipped while in early stages of incubation, successfully renested and brought off broods. Ranges of five hens were 20-52 acres and averaged 30.8. Eggs were laid after midday and time spent on the nest increased with number of eggs laid. Hens usually left the nest for about an hour in the afternoon. Brood-rearing was restricted to 5-10 acres around the nest for the first 3 weeks. The renesting interval for two hens was 10 and 11 days and renests were approximately 485 and 578 ft from the first.

Little is known of movements and range of a pheasant hen and her brood during the breeding cycle. A radio-telemetry study was conducted during spring and summer of 1965 and 1966 to learn more about these factors.

STUDY AREA

Hens were instrumented on the state-owned Rifle-Calahan public shooting area

in Sanborn County in east-central South Dakota. Approximately 68 percent of the 2.4-mile² area consists of grass and hayland, 25 percent temporary and permanent wetlands, 4 percent cultivated, and 2 percent shelterbelts and abandoned farmsteads. The area is gently rolling glaciated upland with loam soils.

METHODS

Birds were captured for instrumentation by use of the night-lighting method (Smith 1954, Drewien et al. 1967, Labisky 1968). Incubating females were caught during the daytime with long-handled landing nets.

¹This study was conducted under Federal Aid in Wildlife Restoration Project W-75-R in South Dakota.

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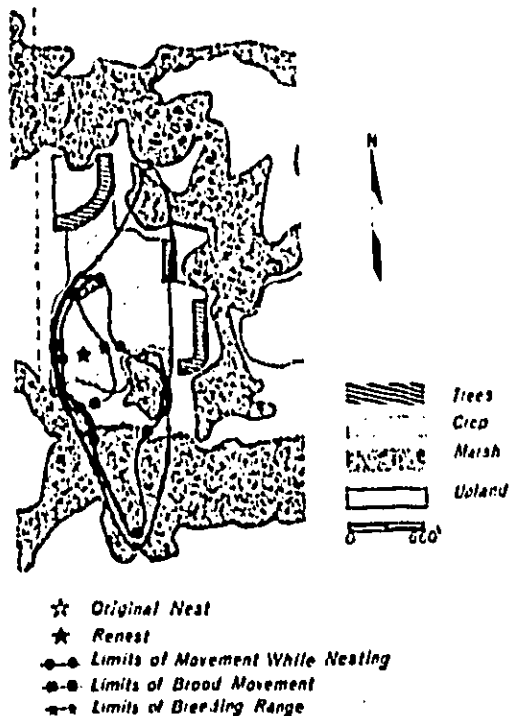


Fig. 1. Range of pheasant hen No. 1 during breeding, nesting, and early brood rearing, May 28-July 28, 1965.

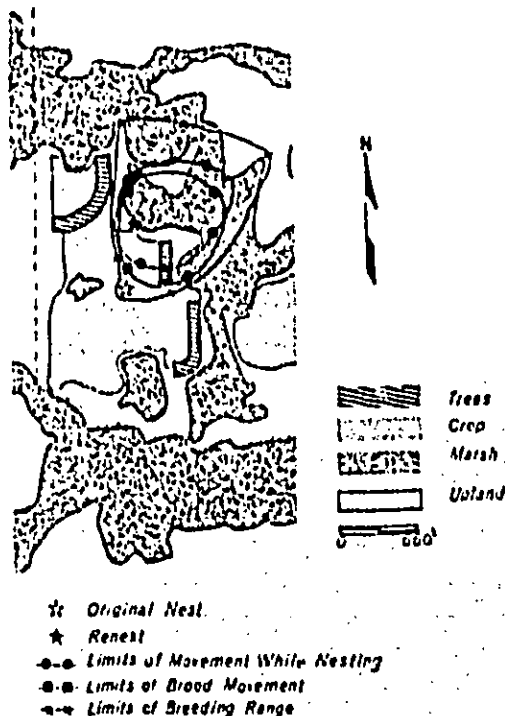


Fig. 2. Range of pheasant hen No. 2 during breeding, nesting, and early brood rearing, June 9-August 13, 1965.

Five hens were equipped with 151 mHz transmitters made by Sidney Markusen, Cloquet, Minnesota. Transmitters, receivers, antennas, and methods of azimuth locations have been described by Marshall (1963). Bird-harnessing techniques (Marshall 1963, Brander 1968) were modified for a solderless battery hookup which allowed rapid instrumentation of birds and utilized a second set of leads as a harness (Kuck 1966).

Three stationary directional antennas were erected at high points on the study area to receive distant signals, and a hand antenna was used for close locations of instrumented birds. Individual birds were radio-tracked up to 63 days. Signal directions were taken at hourly intervals when-

ever possible. Accuracy of the system was computed by using known nesting sites of three monitored hens. The azimuth of the nesting site was determined using two stationary antennas after the hen had left the nest. The azimuth was compared with those recorded while the bird was on the nest (Table 1).

Pheasant embryos were aged according to Labisky and Opsahl (1958).

RESULTS

Two of the five hens experienced difficulty in flying or walking after release, but recovered quickly and carried transmitters with no visible effects. Two instrumented hens brought off broods.

Table 1. Degree of error for radio locations on three nesting hens.

NUMBER LOCATIONS	DISTANCE OF NEST SITE FROM ANTENNA (FEET)		ERROR RANGE (°) ANTENNA		MEAN ERROR (°) ANTENNA	
	A	B	A	B	A	B
103	1551	1032	0-5.0	0.1-7.0	1.4	1.8
46	924	1815	0-8.0	0.3-0.7	2.4	2.5
41	1818	726	0-4.1	0-10	1.2	0.0

A total of 917 radio fixes or locations was made on five pheasant hens during all phases of the reproduction cycle, from April 14-August 13, 1965, and June 17-August 15, 1966.

Breeding Activities

Breeding areas for five instrumented hens were 20, 24, 20, 52, and 38 acres and averaged 30.8 acres, based on the extremes of radio locations. Most activity of hens focused on the nest and covered 5-10 acres (Figs. 1 and 2).

Nest Attentiveness

During their laying period, the five hens went to their nests between midday and 2:30 pm CST. In early egg laying, one was on or near her nest by 2:00 pm but while laying the last three eggs in her clutch of eight, she was on or near her nest by 1:00 pm. Another hen was always on or near her nest by 12:30 pm for the laying of her first six eggs. She was on the nest at 12:00 noon while laying her seventh egg and 10:15 am for her final egg. On this latter date she remained on the nest throughout the day, probably her first day of incubation. A third hen was always on or near the nest by 1:00 pm while laying the last three eggs in a clutch of 10. The exact time two other hens went to their nests was not determined although it was sometime between midday and 2:30 pm.

Hens spent successively more time on

the nest as the number of eggs in the clutch increased. Time spent on the nest while laying the first two eggs was 1-2 hours. This steadily increased as clutch size increased. One hen spent more than 6 hours on her nest when her eighth and final egg was laid. Another was on her nest for nearly 5 hours when the seventh egg was laid. She spent most of the day on the nest while laying her eighth and final egg.

Monitored hens left their nest only once daily unless otherwise disturbed. Leopold (1933:362) mentioned that incubating hen pheasants leave the nest at dawn and 4:00 pm. Hens in this study interrupted incubation for approximately 1 hour in late afternoon, except that one left her nest quite consistently near 10:00 am. These findings agree with those of Klomglan et al. (1950:176).

Nest Desertion and Renesting

Four of the five hens deserted their nests when they were initially radio-equipped while laying or incubating. This desertion was attributed to handling and to the transmitter.

Once a hen became adjusted to the transmitter and harness, it was virtually impossible to cause her to desert by disturbing her at the nest, especially after she had begun incubation. When one hen was in her seventh day of incubation, the radio battery went dead. The first attempt to capture her at 11:30 am failed. Within 2 hours she was back on the nest and was captured and by mid-afternoon she was again incubating. Another renesting hen returned to her nest three times after attempts to capture her there were unsuccessful. She was finally captured there on the fourth attempt. A third hen was flushed from her nest four times after incubating 15 days and on each occasion she returned.

Two radio-marked hens renested and

brought off broods in 1965. Both were in early stages of incubation when first radio-equipped on May 28 and June 9. One hen began renesting 11 days after deserting her previous clutch. A second hen began laying 10 days after her clutch was destroyed. Two hens that did not renest in 1966 were radioed on June 17 and 27. One was in late incubation, the other early. Seubert (1952:327) noted that hens are more likely to renest if disrupted early in incubation. He also noted that after a certain point in the nesting season, renesting seldom occurs regardless of stage of incubation.

Two renesting hens in this study moved approximately 485 and 578 ft from their first nest locations. Gates (1966:313), who reported renesting of 11 marked birds in the wild, found renesting hens selected sites averaging 1,214 ft from their original nest.

Three hens, studied during their initial nesting attempts, selected residual cover types for nesting. Two nested in dry marshes, the third in an upland weed patch. One of the two hens abandoning nests when instrumented, selected an alfalfa hay-field for renesting. Her previous nest was in reed canary grass (*Phalaris arundinacea*) in a dry marsh. The second hen moved from an oats field to the edge of a Type 3 marsh. Gates (1966:314) noted that 9 of 11 renesting hens selected hayfields whereas their initial nests were in more permanent cover types.

Movements and Behavior of Hens with Broods

Brood movements were restricted to 5-10 acres in the vicinity of the nest for the first 3 weeks (Figs. 1 and 2). Three hens with broods utilized all types of cover available in the vicinity of the nest. Gates (1966:310, 312) reported a marked hen pheasant with 11-week-old chicks to be within 1,320

ft of the nest site and a second renesting hen with 4-week-old chicks, 792 ft from the site of her original nest. Linder and Agee (1965) stated that nesting and brooding areas for pheasants in Nebraska were close together.

SUMMARY AND CONCLUSIONS

During the nesting season, hens centered their activities around the nest site. Ranges of hens were 20-52 acres and averaged 30.8. Two hens renested after 10 and 11 days about 485 and 578 ft from previous nests.

Typically, a hen that deserted or had her nest destroyed remained sedentary for 1 or 2 days before moving. If renesting occurred, the hen broadened her activity range until she was again bred by the cock and then confined activity to the nest area until her brood was reared. If renesting did not occur, the hen ranged more widely and there seemed to be no well-defined center of activity as for nesting hens.

Brood movement was restricted to an area of 5-10 acres around the nest site for 3 weeks following hatching. This probably accounts for the small number of broods in the 1-2 week age-class observed during brood surveys. Restricted movements of young broods would indicate brood surveys sample only those which are produced in roadside ditches and field borders. This would bias comparison of areas with ample cover and those lacking field borders and road right-of-way cover.

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